

**Third Annual HerpBlitz:
Grayson Highlands State Park with side trips to White Top Mountain
and adjoining streams.**

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Introduction

The third annual HerpBlitz was conducted in southwest Virginia at Grayson Highlands State Park 26-29 June 2008. This site was selected due to lack of sampling data from this region and its high potential for finding less common and endemic species. Grayson Highlands State Park is located in Grayson County and lies within the Blue Ridge physiographic province. The State Park is within the New River watershed. Jefferson National Forest and Mount Rogers National Recreation Area border the perimeter of the park. Adjacent to the park and visible from the peaks at the park are Mount Rogers and Whitetop Mountain, the highest peaks in the state of Virginia. The southern edge of the park has an elevation of 975 meters. This rises to Little Pinnacle, the highest peak at the park (elevation 1,551 meters). The park comprises 1,997 hectares. Grayson Highland State Park was established in 1965 and originally named Mount Rogers State Park. The park has a rich history with many park landmarks named after early settlers and hunters who lived or hunted within the currently established park boundaries. Of note, Massie Gap is named after a settler who lived with his wife and five children in the area. During the early 1900s large stands of virgin spruce and fir were heavily logged (Pague, 1984) leaving behind regrowth forest and balds. Fire and livestock grazing have prevented the regrowth of the spruce and fir stands in some areas. Consult Winegar and Winegar (2002) for a concise summary of habitats and trails within the park. During the course of the survey, short field trips were made to Whitetop Mountain, Little Laurel Branch (a stream adjacent to WhiteTop Mountain), and Cabin Creek as it intersects Route 58.

Study Sites

Grayson Highlands State Park Sites

Site 1: Stampers Branch Creek Trail (36°38'5.83"N 81°29'50.17"W * GPS coordinates represent a reading taken at the central point of each study site.) (Friday, 27 June) - This trail is 2.75 km. long and begins at the park store. The trail winds through a mature forest comprised of red oak, yellow birch, red and sugar maple, and hemlock. The southeast side of the trail dips down into a ravine. Much of the forest floor is littered with fallen tree debris and rocks. During the course of our survey, two spring fed streams were crossed and searched. The second stream encountered was enclosed by a rhododendron thicket.

Site 2: Cabin Creek Trail (36°38'0.63"N 81°31'9.90"W) (Saturday, 28 June) - Cabin Creek Trail is 3 km. long. During the survey period we walked the entire trail, surveying the creek and surrounding wooded forest. Mountain laurel and flame azalea were in full bloom at the beginning of the trail. Cabin Creek is a small perennial stream with many rocks. It winds through a mature wooded forest with a similar tree composition as listed for the Stampers Branch Creek trail.

Site 3: Big Pinnacle Trail (36°37'46.74"N 81°30'23.84"W) (Saturday, 28 June) – This trail is a steep climb from the parking lot at Massie Gap to the top of Big Pinnacle (1,545 m elevation). Many rocks and fallen trees line both sides of the trail. The forest is mature and the views from the top are breathtaking.

Site 4: Stampers Branch Creek Trail (Saturday, 28 June) - See above description.

Site 5: Ranger house and surrounding habitat (36°36'29.73"N 81°29'34.40"W) (Friday, 27 June) - This site is the lowest elevation site within the State Park boundaries. This site consists of a small dammed pond, used for watering cattle and two cow pastures surrounding a stream with a small patch of hardwood forest. The stream is small and appears to be perennial. Many rocks and logs were covering the forest floor.

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Other Sites outside Grayson Highland State Park

Site 6: White Top Mountain (Friday, 27 June) (36°38'19.47"N 81°36'19.66"W) – The top of White Top Mountain is one of the most interesting habitats the author has seen in Virginia. The forest consists of *Picea rubens* (Red Spruce) and *Abies fraseri* (Frazier Fir). The canopy is very dense and little light penetrates to the ground. Because of the dense canopy the forest floor is very moist. Moss grows over the surface of most forest floor objects. Like any evergreen forest, the floor is covered with a thin layer of needles. Many logs, branches, and rocks are on the forest floor. White Top Mountain is the second highest peak in Virginia with an elevation of 1,682 meters.

Site 7: Little Laurel Creek (Friday, 27 June) (36°40'17.58"N 81°37'27.78"W) – A short visit was made by three team members to this small stream which crosses county route 603 and is at the base of Whitetop Mountain. The Little Laurel is a feeder stream into Big Laurel Creek. In 1992 the VHS surveyed the Big Laurel Creek and discovered the shovel-nosed salamander (*Desmognathus marmoratus*) (Hayslett, 1992). It was the hope of this team to find this species.

Site 8: White Top Mountain (Sunday, 29 June) – See above description.

Site 9: Stream at intersection of Route 749 and Route 58 (36°36'18.82"N 81°31'16.85"W) (Thursday, 26 June) – Cabin Creek is a moderate sized stream draining parts of Grayson Highlands State Park. The creek is surrounded by *Rhododendron* thickets and has a bottom substrate comprised of a mixture of large and small cobblestone.

Materials and Methods

The third annual Herp Blitz began the afternoon of 26 June and lasted until 1200 h on 29 June, 2008. For each site described above Table 1 indicates the number of surveyors, time spent surveying, and total number of person hours spent at each site. Collecting techniques used during the survey included over-turning cover objects, listening for calling anurans, visual encounters, road cruising, dipnetting, hand capture, and using baited hoop turtle traps. Each individual animal caught was inspected for general health and evidence of disease. Digital photos were taken of each different species collected. Each leader of a survey group recorded

the following information for each survey site: relative numbers of animals found, unusual behaviors exhibited by animals, microhabitat data, and diseases or malformations observed.

Table 1: The amount of survey effort for each research site.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Number of hoop net sets					2				
Number of surveyors	6	15	10	5	6	3	3	8	3
Hours surveyed	2	2	1	1	2	1	.1	1	1
Person hours of survey effort	12	30	10	5	12	3	.3	8	3

Results

During the course of this four day event a total of 16 species of amphibians and reptiles were documented. Of the 16 species two were anurans, 12 were salamanders, and two were snakes. No turtles or lizards were found during the weekend. *Pseudacris crucifer* is not documented for Grayson County in Tobey (1985), Mitchell and Reay (1999), or the Virginia fwis database and is thus a county record. A voice recording of the lone male heard calling was not collected. Table 2 summarizes each species and the numbers of animals observed at each survey site. An annotated checklist follows. Numbers in brackets denote the survey sites where each species was documented.

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Table 2. Summary of the number of animals observed at each site.

	1	2	3	4	5	6	7	8	9	Total
Species										
Amphibians										
<i>Lithobates clamitans</i>					1					1
<i>Pseudacris c. crucifer</i>					1					1
<i>Desmognathus fuscus</i>	4									4
<i>Desmognathus monticola</i>	7	4		6	9		1		8	45
<i>Desmognathus orestes</i>	22	38		9	11		8		12	100
<i>Desmognathus quadramaculatus</i>	6	5		1	3				9	24
<i>Desmognathus wrighti</i>						1		2		3
<i>Eurycea wilderae</i>	1	1			3				2	7
<i>Gyrinophilus porphyriticus</i>	1									1
<i>Plethodon cinereus</i>	1		4			8		4		17
<i>Plethodon cylindraceus</i>	2				7					9
<i>Plethodon montanus</i>	22	40	44	5	28	9		4		152
<i>Plethodon welleri</i>						2		2		4
<i>Plethodon yonahlossee</i>	4	11								15
Reptiles										
<i>Diadophis punctatus</i>					1					1
<i>Thamnophis s. sirtalis</i>					2					2
Total Number of animals by site	70	99	48	21	76	21	9	12	31	387

Annotated Checklist

Amphibians

1. *Lithobates clamitans* (Green Frog) – [5]

Only one adult Green Frog was found in a man-made pond adjacent to the park ranger's residence. Several Green Frog tadpoles were dipnetted in the pond.

2. *Pseudacris crucifer crucifer* (Northern Spring Peeper) – [5]

One lone male Spring Peeper was heard calling around 0900 hours. This male frog was calling at the edge of the pond and near a wooded area. A search around the pond did not yield any adult animals or metamorphs.

3. *Desmognathus fuscus* (Northern Dusky Salamander) – [1]

Four adult Northern Dusky Salamanders were found under rocks along the spring fed streams at site one.

4. *Desmognathus monticola* (Seal Salamander) – [1,2,4,5,7,9]

Desmognathus monticola was the third most numerous salamander species found during the weekend. Forty-five Seal Salamanders were found under rocks and logs in or adjacent to streams.

5. *Desmognathus orestes* (Blue Ridge Dusky Salamander) – [1,2,4,5,7,9]

The Blue Ridge Dusky Salamander was the second most commonly found salamander at the survey sites. It was found at six sites, none of these sites were the highest altitude sites. All animals were found under rocks and logs. This *Desmognathus* species was not found in streams but rather in the woodlands surrounding streams.

6. *Desmognathus quadramaculatus* (Black-bellied Salamander) – [1,2,4,5,9]

Black-bellied Salamanders were found under rocks in streams. A total of 24 animals were discovered.

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7. *Desmognathus wrighti* (Pygmy Salamander) – [6,8]

Pygmy Salamanders were found only on White Top Mountain. All were found under logs. Pague (1984) searched Grayson Highlands State Park for *Desmognathus wrighti* and *Plethodon welleri* in 1983 but did not find any during his sampling time period.

8. *Eurycea wilderae* (Blue Ridge Two-lined Salamander) – [1,2,5,9]

Only seven 2-lined salamanders were found. One specimen taken from site five was tested using protein gel electrophoresis and found positive for the marker for the Blue Ridge Two-lined Salamander. Other 2-lines found during the survey were not tested but upon visual inspection did have the physical characteristics for the Blue Ridge 2-lined Salamander. Without positive electrophoresis results, the other 2-lined Salamanders could be *Eurycea cirrigera*.

9. *Gyrinophilus porphyriticus* (Spring Salamander) – [1]

A larval Spring Salamander was found in a small stream at site one. One other larva was found in this stream but was not developed enough to positively identify as *Gyrinophilus porphyriticus*.

10. *Plethodon cinereus* (Red-backed Salamander) – [1,3,6,8]

Red-backed Salamanders were found at three sites. Two of these sites, Big Pinnacle Trail and White Top Mountain, were the highest elevation sites that were surveyed. These salamanders seem to be able to inhabit mixed spruce/fir and mixed hemlock, oak, birch, maple forests. All animals were found under logs.

11. *Plethodon cylindraceus* (White-spotted Slimy Salamander) – [1,5]

Nine White-spotted Slimy Salamanders were discovered under logs at sites one and five. The two sites both consisted of mature forests with small nearby streams.

12. *Plethodon montanus* (Northern Gray-cheeked Salamander) – [1,2,3,4,5,6,8]

The Northern Gray-cheeked Salamander was found at six sites. 148 individual adults and juvenile salamanders were found during the weekend. This species was found at the lowest elevation sites at Grayson Highlands State Park and also the highest elevation sites. All animals were found under rocks or logs. One juvenile found under a log was observed to have anophthalmia (Figure 1). Upon visual inspection it appeared the eye never developed but the specimen was not preserved or inspected by an expert in malformations. A search of the North American Reporting Center for Amphibian Malformations (NARCAM) (http://www.nbii.gov/portal/server.pt?open=512&objID=386&&PageID=1101&mode=2&in_hi_userid=2&cached=true) and Beamer & Lannoo's (2005) recent summary of *Plethodon montanus* yielded no reports of anophthalmia in this species.

13. *Plethodon welleri* (Weller's Salamander) – [6,8]

Weller's Salamanders were only found on White Top Mountain. All animals were found under logs. See Roble (2004) for a complete review of this species' distribution in Virginia.

14. *Plethodon yonahlossee* (Yonahlossee Salamander) – [1,2]

A total of 15 Yonahlossee Salamanders were found at sites one and two. One small salamander was found in a log, the rest of the salamanders were found under logs. *Plethodon yonahlossee* was not found on Whitetop Mountain (despite two searches) and the high elevation site in Grayson Highlands State Park. Pope (1950) reports finding this species on Whitetop Mountain even at elevations of 1,646 meters. The two sites where Yonahlossee were observed were at elevations around 1,219 meters. Hoffman (1992) summarizes his 40 years of searching for this species and states that Yonahlossee prefers elevations of 1,000-1,333 meters; our observations harmonize with his summary.

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Reptiles

15. *Diadophis punctatus* (Ring-necked Snake) – [5]

The search around the park ranger's residence produced one adult Ring-necked Snake. This animal was found under a large log at the edge of a mature forest. Phenotypically this snake had no half moons or spots on its venter and a full yellow ring around its neck, consistent with *Diadophis p. edwardsii* the Northern ring-necked Snake.

16. *Thamnophis sirtalis sirtalis* (Eastern Gartersnake) – [5]

Only two Gartersnakes were found at site five. One snake was found under a log and the other snake was found under a piece of tin in a scrap pile near a park work shed.

Discussion

The Grayson Highland area has a unique assemblage of species with interesting biogeographical implications. For the species list generated from this survey three major groups of herps are inferred. The first group is the Blue Ridge endemics. These species are specifically found only in the Blue Ridge Mountains. The Blue Ridge endemics include: *Desmognathus orestes*, *Desmognathus wrighti*, *Eurycea wilderae*, *Plethodon montanus*, *Plethodon welleri*, and *Plethodon yonahlossee*. The second assemblage follows the Appalachian pattern. These species are associated with montane habitats of the Appalachian Mountains. Species following the Appalachian pattern include: *Desmognathus monticola*, *Desmognathus quadramaculatus*, and *Gyrinophilus porphyriticus*. The last group consists of species with statewide distribution. This group includes: *Pseudacris crucifer*, *Lithobates clamitans*, *Desmognathus fuscus*, *Plethodon cinereus*, *Thamnophis sirtalis*, *Diadophis punctatus*, and *Plethodon cylindraceus*. The assemblage of organisms obtained from this site is a vestige of a much different time period and any interpretation must take into account the climatic and botanical composition of the past.

Grayson Highlands State Park faces many challenges. How do resource managers develop plans to promote the continuation of species weighed against the pressure from the public to use the land for recre-

ation? Initially I was stunned to learn that this state park allowed hoofed animals to graze freely in certain sections. In addition, Grayson allows horses to be stabled within park confines. Grazing in the Massie Gap area has allowed the formation of an open meadow. This is a unique characteristic of the park which I found to be aesthetically pleasing is detrimental to many species of salamanders which require moist leaf litter and soil. There are several species that may have historically existed in Grayson but were probably extirpated by logging and forest fires (ie. *Desmognathus wrighti* and *Plethodon welleri*). These species are found in surrounding habitats and would probably immigrate to this area if the appropriate habitat was allowed to regenerate (ie Spruce, Fir forest). The grazing ponies and cowpasture at the southern edge negatively impact amphibians. Montane ecosystems found within the park boundaries are rare in Virginia and are sensitive to the effects of climate change and drought. More research and data collection should occur in the park to allow for long term monitoring of the health of this rare ecosystem. In regards to reptiles and amphibians, debris piles make excellent habitat. The debris around the ranger's house was some of the best habitat surveyed for snakes. Debris should be allowed to collect wherever it falls. A park cleared of woody debris is not in the interest of herps.

This survey was too brief and too limited in scope to make a final list of reptiles and amphibians for the Park. Future work in the area should include calling anuran surveys in the southern part of the park during spring and summer. With some effort the following anuran species might be added to the park's species list: *Lithobates catesbeianus*, *Lithobates palustris*, *Lithobates sylvaticus*, *Pseudacris brachyphona*, *Hyla chrysoscelis*, *Anaxyrus americanus* and *Anaxyrus fowleri*. Drift fence arrays and more time constrained searches may perhaps yield the following species of salamanders: *Ambystoma maculatum*, *Plethodon richmondi*, *Eurycea longicauda longicauda*, *Notophthalmus viridescens viridescens*, *Pseudotriton ruber*, and *Pseudotriton montanus*. Perhaps additional baited hoop turtle traps could catch *Chelydra serpentina*. *Terrapene carolina* have been found near the ranger's house (Kevin Kelley per. comm.). Elevation is a major impediment to finding additional snake species and lizards. After reviewing Mitchell and Reay (1999), the species most likely to be found on park property include: *Plestiodon fasciatus*, *Sceloporus undulatus*, *Agkistrodon contortrix mokasen*, *Carphophis amoenus amoenus*, *Coluber constrictor*, *Pantherophis alleganiensis*, *Lampropeltis traingulum*, and *Nerodia sipedon*. A complete survey of this park would

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be of interest in this montane situation to allow for documentation of species migrating into the park due to a warming climate. Baseline data is needed now to document these changes. Health assessments and population data of all species are also warranted to detect the spread of infectious disease. *Batrachochytrium dendrobatidis*, is an introduced parasitic chytrid fungus which is causing devastation to many species of amphibians around the world. This fungus has been detected in Virginia. Any amphibian found dead should be preserved in 95% denatured ethanol and sent to a lab with the capacity to test for BD. Chytridiomycosis is one of several diseases that managers of Grayson Highlands should be knowledgeable about. Ranaviral infections and ichthyophonosis are two other diseases recently reported in amphibians in Virginia (Ware et.al, 2008; Gibson & Ware, 2008; Gibson et.al, 2007). Contaminated fishing equipment is a possible vector in the spread of these diseases. Park managers should be on the look out for anything that looks out of the ordinary. The Virginia Herpetological Society should be contacted if any dead or diseased amphibians or reptiles are found.

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Figure 1. *Plethodon montanus* exhibiting anophthalmia.